ISSN 0149-0451

Geomicrobiology Journal

Volume 13
1995

An International Journal of Geomicrobiology and Microbial Biogeochemistry

Taylor & Francis
Publishers since 1798

GEOMICROBIOLOGY JOURNAL

CO-EDITORS

Henry L. Ehrlich
Rensselaer Polytechnic Institute
Troy, NY

William C. Ghiorse
Cornell University
Ithaca, NY

EDITOR FOR EUROPE

R. J. Parkes
University of Bristol
Bristol, UK

EDITOR FOR AUSTRALASIA

John Bauld
Bureau of Mineral Resources
Canberra, A.C.T., Australia

FOUNDING EDITOR

Claude E. ZoBell

ASSOCIATE EDITORS

Martin Alexander
Cornell University
Ithaca, NY

Jacques Berthelin
Centre de Pedologie Biologique
Vandouvre-Les-Nancy, France

David R. Boone
Oregon Graduate Institute of Science and Technology
Beaverton, OR

Klaus Bosecker
Bundesanstalt für Geowissenschaften und Rohstoffe
Hannover, Germany

Tom Fenchel
University of Copenhagen
Helsingør, Denmark

F. Grant Ferris
University of Toronto
Toronto, Canada

V. M. Gorlenko
Institute of Microbiology
Moscow, Russia

Ralf O. Hallberg
University of Stockholm
Stockholm, Sweden

Akihiko Hattori
University of Tokyo
Tokyo, Japan

Peter Hirsch
Christian Albrechts Universität
Kiel, Germany

Mikhail V. Ivanov
Academy of Sciences
Moscow, Russia

Don P. Kelly
National Environment Research Council
Swindon, UK

Tadashiro Koyama
Water Research Institute
Nagoya Aichi, Japan

Wolfgang E. Krumbein
University of Oldenburg
Oldenburg, Germany

Kevin C. Marshall
University of New South Wales
Kensington, N.S.W., Australia

Richard Y. Morita
Oregon State University
Corvallis, OR

Ronald S. Oremland
U.S. Geological Survey
Menlo Park, CA

J. William Schopf
University of California
Los Angeles, CA

John J. Skujiņš
Utah State University
Logan, UT

James T. Staley
University of Washington
Seattle, WA

Donald W. Westlake
University of Alberta, Edmonton
Canada

Abstracted and/or Indexed in: Bioscience Information Service; Chemical Abstracts Service; Current Advances in Ecological Sciences; Current Contents/Agriculture, Biology & Environmental Sciences; Current Contents/Life Sciences; Ecological Abstracts; Geographical Abstracts; International Development Abstracts; ISI/ Geo Sci Tech; Microbiology Abstracts; Science Citation Index.

Editorial Office: Henry L. Ehrlich, Department of Biology, Rensselaer Polytechnic Institute, Troy, NY 12180-3590 USA.

Publishing and Production Offices: Taylor & Francis, 1101 Vermont Ave., NW, Suite 200, Washington, DC 20005-3521; Ellen Korn, Production Editor. **Advertising Office:** 1900 Frost Road, Suite 101, Bristol, PA 19007, phone (215) 785-5800, fax (215) 785-5515; Angela Vizzoni, Advertising Coordinator. **Subscriptions Office:** 1900 Frost Road, Suite 101, Bristol, PA 19007; or Taylor & Francis Ltd., Rankine Road, Basingstoke, Hampshire RG24 8PR, UK, phone + 44-1256-840366, fax + 44-1256-479438.

Geomicrobiology Journal (ISSN 0149-0451) is published quarterly by Taylor & Francis Ltd., 1 Gunpowder Square, London EC4A 3DE, UK. Annual 1995 subscription rate (Volume 13) UK £100, US $165. Personal subscription rate UK £50, US $86; available to home address only and must be paid for by personal check or credit card.

Second-class postage rates paid at Jamaica, NY 11431. U.S. Postmaster: send address changes to **Geomicrobiology Journal**, Publications Expediting, Inc., 200 Meacham Avenue, Elmont, NY 11003. Airfreight and mailing in the USA by Publications Expediting Inc., 200 Meacham Avenue, Elmont, NY 11003.

Dollar rates apply to subscribers in all countries except the UK and the Republic of Ireland, where the sterling price applies. All subscriptions are payable in advance and all rates include postage. Journals are sent by air to the USA, Canada, Mexico, India, Japan, and Australasia at no extra cost. Subscriptions are entered on an annual basis, i.e., January to December. Payment may be made by sterling check, dollar check, international money order, National Giro, or credit card (AMEX, VISA, Mastercard/ Access).

Orders originating in the following territories should be sent directly to: **India**—Universal Subscription Agency Pvt. Ltd., 101-102 Community Centre, Malviya Nagar Extn., Post Bag No. 8, Saket, New Delhi; **Japan**—Kinokuniya Company Ltd., Journal Department, P.O. Box 55, Chitose, Tokyo 156; **USA, Canada, and Mexico**—Taylor & Francis, Inc., 1900 Frost Road, Suite 101, Bristol, PA 19007, USA; **UK and all other territories**—Taylor & Francis Ltd., Rankine Road, Basingstoke, Hampshire RG24 8PR, England.

Copyright © 1995 Taylor & Francis. All rights reserved. Authors are responsible for obtaining permission to reproduce copyrighted material from other sources and are required to sign an agreement for transfer of copyright to the publisher. Printed in the United States of America. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by Taylor & Francis for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of $12.00 per copy plus .00 per page is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, USA.

The publisher assumes no responsibility for any statements of fact or opinion expressed in the published papers. The appearance of advertising in this journal does not constitute an endorsement or approval by the publisher, the editor, or the editorial board of the quality or value of the product advertised or of the claims made for it by its manufacturer.

Geomicrobiology Journal is owned by Taylor & Francis.

♾The paper in this publication meets the requirements of the ANSI Standard Z39.48-1984 (Permanence of Paper), effective with Volume 10, Number 1, 1992.

GEOMICROBIOLOGY JOURNAL

Volume 13, Number 1
1995

Contents

Precipitation of Arsenic During Bacterial Sulfate Reduction
Keith A. Rittle, James I. Drever, and Patricia J. S. Colberg 1

Microbiological, Chemical, and Mineralogical Characterization of the Kidd Creek Mine Tailings Impoundment, Timmins Area, Ontario
David W. Blowes, Tom Al, Lyne Lortie, W. Douglas Gould, and John L. Jambor 13

Characteristics of Anaerobic Mixed Cultures Isolated from Alkaline and Oligotrophic Habitats
Martin Wenk and Reinhard Bachofen 33

Characterization of Proteases Extracted from a Compost of Municipal Solid Wastes
J. C. Rad, M. Navarro-González, and S. González-Carcedo 45

Microbial Precipitation of a Strontium Calcite Phase at a Groundwater Discharge Zone Near Rock Creek, British Columbia, Canada
F. G. Ferris, C. M. Fratton, J. P Gerits, S. Schultze-Lam, and B. Sherwood Lollar 57

Further Readings in Geomicrobiology 69

Meeting Announcements 73

GEOMICROBIOLOGY JOURNAL

Volume 13, Number 2
1995

Contents

Bacterial Sulfate Reduction and Pyrite Formation in a Polluted Sand Aquifer
Simon H. Bottrell, Peter J. Hayes, Michelle Bannon, and Geoff M. Williams 75

Microbial Communities in Deep Canadian Shield Groundwaters—An In Situ Biofilm Experiment
F. Doig, B. Sherwood Lollar, and F. G. Ferris 91

Uptake of Polonium and Sulfur by Bacteria
Jennifer Cherrier, William C. Burnett, and Paul A. LaRock 103

Discovery of Ca Oxalate Crystals Associated with Fungi in Moss Travertines (Bryoherms, Freshwater Heterogeneous Stromatolites)
Pierre Freytet and Eric Verrecchia 117

Effect of Alder (*Alnus glutinosa* L. Gaertn.) Roots on Distribution of Proteolytic, Ammonifying, and Nitrifying Bacteria in Soil
J. M. Pozuelo Gonzalez, F. J. Gutierrez Mañero, A. Probanza, N. Acero, and F. Bermudez De Castro 129

Further Readings in Geomicrobiology 139

Meeting Announcements 143

GEOMICROBIOLOGY JOURNAL

Volume 13, Number 3
1995

Contents

Oxidation of Polymetal Sulfides by Chemolithoautotrophic Bacteria from Deep-Sea Hydrothermal Vents
Carolyn Eberhard, Carl O. Wirsen, and Holger W. Jannasch 145

Enhanced Activity of Oligotrophic Endogenous Bacteria in Clay-Rich Sediments by Nutrient Injection
Regina M. Capuano, Maria Auxilia Siringan, Rezie Z. Jan, and Peter Jurtshuk, Jr. 165

Occurrence and Geochemical Activity of Microorganisms in High-Temperature, Water-Flooded Oil Fields of Kazakhstan and Western Siberia
Tamara N. Nazina, Anna E. Ivanova, Igor A. Borzenkov, Sergei S. Belyaev, and Michail V. Ivanov 181

Methane Production in Two Indian Rice Soils
B. Ramakrishnan, S. N. Satpathy, P. Patnaik, T. K. Adhya, V. R. Rao, and N. Sethunathan 193

Book Reviews 201

Further Readings in Geomicrobiology 205

Meeting Announcements 209

GEOMICROBIOLOGY JOURNAL

Volume 13, Number 4
1995

Contents

Acknowledgments 211

Significance of the Biomineralizing Microniche in a *Lyngbya* (Cyanobacterium) Travertine
Allan Pentecost 213

Lichenic Alteration and Mineralization in Calcareous Monuments of Northeastern Spain
F. Blázquez, F. Calvet, and M. Vendrell 223

Bacterial Transport in Volcanic Tuff Cores Under Saturated Flow Conditions
Sandra P. Story, Penny S. Amy, Carolyn W. Bishop, and Frederick S. Colwell 249

Comparative Soil Study in a Mediterranean Ecosystem of *Quercus pyrenaica* (Willd.)
C. Quilchano, J. A. Egido, and M. I. González 265

Meeting Report 281

Book Review 283

Further Readings in Geomicrobiology 285

Meeting Announcements 291

Following page 291:
Title page to Volume 13
Contents of Volume 13
Author Index to Volume 13